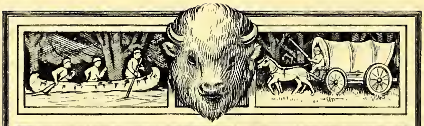

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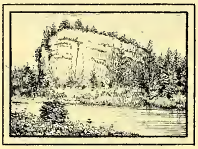

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Report from the Sec. of War March 7, 1838
transmitting a report of the survey of the Kaskaskia
and Illinois rivers ---fold out map at page 2

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Stansbury

REPORT

FROM

THE SECRETARY OF WAR,

IN COMPLIANCE

With a resolution of the Senate of the 5th instant, transmitting a report of the survey of the Kaskaskia and Illinois rivers.

March 7, 1838.

Laid on the table, and ordered to be printed, and that 300 additional copies be furnished for the use of the Senate.

Department of War,
March 6, 1838.

Sir: The enclosed communication of the officer in charge of the Topographical Bureau, is accompanied by the documents in reference to the recent survey of the Kaskaskia and Illinois rivers, in the State of Illinois, called for by the resolution of the Senate of yesterday's date.

Very respectfully,
Your most obedient servant,
J. R. POINSETT.

Hon. R. M. Johnson,
President of the Senate.

Topographical Bureau,
Washington, March 6, 1838.

Sir: I have the honor of submitting to you the report, plans, and estimates in reference to the improvement of the navigation of the Illinois and Kaskaskia rivers, in the State of Illinois, called for by a resolution of the Senate of the 5th instant.

Very respectfully, sir,
Your obedient servant,
J. J. ABERT,
Lt. Col. Top. Engineers.

Hon. J. R. Poinsett,
Secretary of War.

Blair & Rives, printers.

WASHINGTON, *February* 14, 1838.

SIR: I have the honor to submit the following report of the results of an examination of "the Illinois river, from its mouth to the termination of the canal," and of the "Kaskaskia river, from its mouth to Vandalia," made in obedience to your orders, dated April 26, 1837.

ILLINOIS RIVER.

This noble stream is formed by the junction of the Kankakee, or Theakiki, and Des Planes rivers, in latitude 41° 48′ north, in the upper part of the State of Illinois, and discharges its waters into the Mississippi, about twenty miles above its junction with the Missouri. The bottom lands extend from one to five miles on each side of the river, seldom rising more than a few feet above the level of the stream in its ordinary stages, and from the fact that they are constantly overflowed by every freshet, to a depth varying from one to fifteen feet, are now, and must ever remain, uninhabited. Hence, the river presents the appearance of flowing through an ancient, vast, and solitary forest, clothed with a foliage rich and luxuriant beyond description, whose solemn silence has never been broken, save by the howl of the panther or the still more savage yell of the red man. It was upon this stream, that the first settlement was made by the French emigrants from Canada; and here, from the salubrity of the climate, the surpassing beauty of the scenery, and the richness of the soil, they promised themselves the possession of a second paradise.

In an agricultural, commercial, as well as military point of view, this stream is destined to occupy an important rank amongst the rivers of the west. Embracing in the arms of its principal tributaries the southern shores of Lake Michigan, it traverses more than two-thirds of the State of Illinois from north to south, and waters, by its branches, more than half its width, an extent of country unrivalled for the fertility of its soil, perhaps in the world. Most of these tributary streams are susceptible of being rendered so far navigable as to allow the descent of flat-boats in the spring, and many of them, if cleared of the snags and logs, will admit of a limited navigation by keel-boats, and even by small steamboats, for a considerable distance from their mouths.

By means of the Illinois and Michigan canal (less than one hundred miles in length) its waters will be united with those of Lake Michigan, thus completing the connexion, in the internal navigation, of the entire country from New York to New Orleans.

In a military point of view, the uninterrupted navigation of this river cannot be overlooked, as it will afford facilities for the transportation of troops and munitions of war with certainty and celerity, and will thus enable the Government, should it at any time become necessary, to concentrate upon the frontier, with rapidity and ease, any amount of force, whilst, at the same time, the capacity of the valley of the stream to furnish supplies for their use is unbounded.

The instructions of the department required an examination to be made from the mouth of the river to the termination of the canal from Lake Michigan, and the party accordingly proceeded to Peru, the point at which the canal will intersect the river. It was at once ascertained, both from observation and the information of others, that the river was several feet above low water mark, and that all the obstructions to the navigation were

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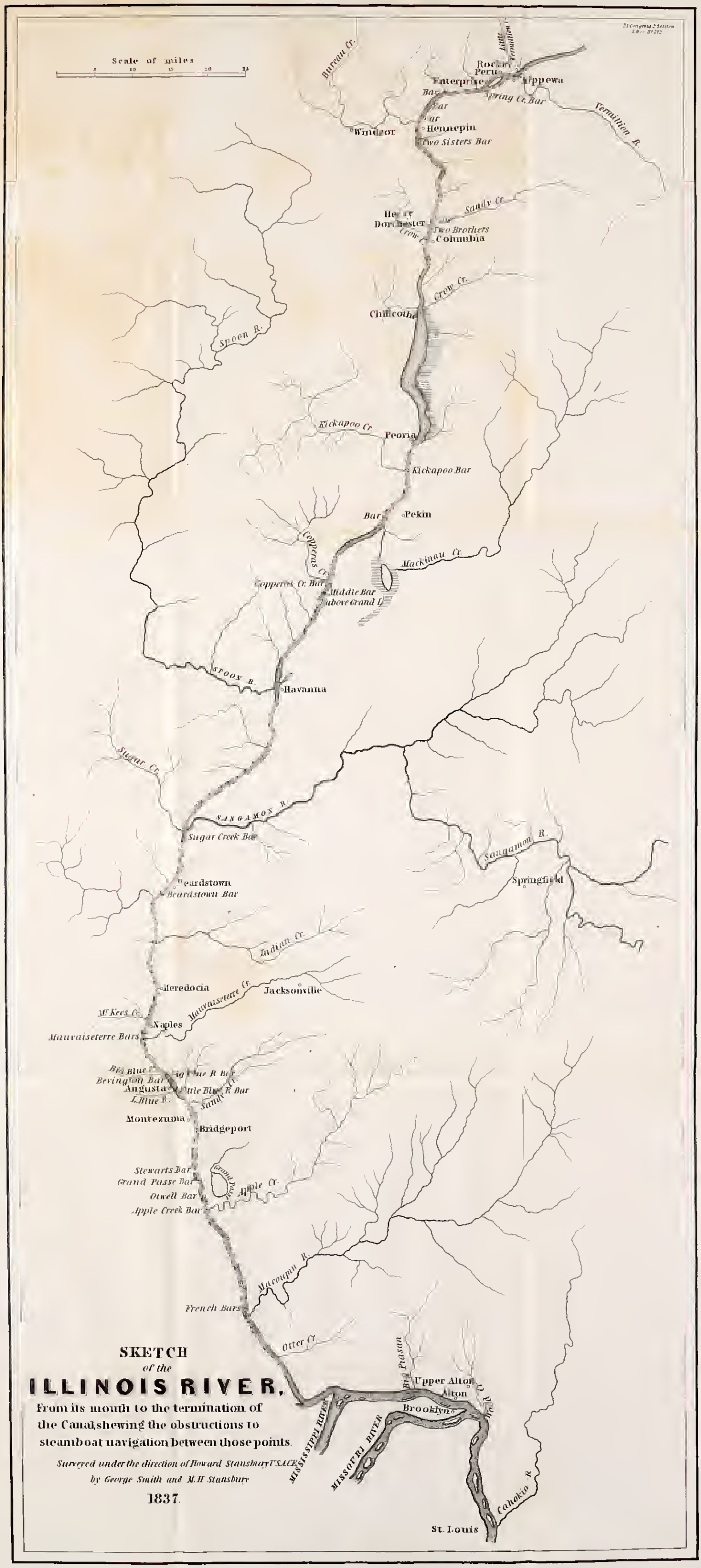

SKETCH
of the
ILLINOIS RIVER,
From its mouth to the termination of
the Canal, shewing the obstructions to
steamboat navigation between those points.

Surveyed under the direction of Howard Stansbury U.S.A.C.E.
by George Smith and M. H. Stansbury
1837.

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above low water mark, and that all the obstructions to the navigation we

in consequence entirely concealed from view, owing to the previous rains which had prevailed to an unusual degree. This proved to be the case during the whole period occupied in making the examination, the stream continuing to rise at intervals, so as to preclude the opportunity of observing the obstacles with that minuteness so desirable and necessary in projecting any plan for their removal. On this account, I should feel some embarrassment and hesitation in recommending any mode of improvement, from which I might be inclined to vary upon examination made when the water was low, and the nature and precise form of the obstructions could be more accurately determined, were it not, that from the general character of the river, the mode of improvement to be adopted in this case cannot be mistaken.

The Illinois river, from Peru to its mouth, flows over a bottom of sand and alluvial matter, with a current so very gentle and uniform as to cause but a few hours' difference in the time occupied by steamboats in ascending or descending its stream, an estimated distance of two hundred and fifty miles. Its banks consist almost entirely of very low alluvial bottoms, skirted by lagoons or lakes, most of which are connected with the river, the whole overflowed by every freshet for several miles on each side. For the greater part of the year, the navigation by steamboats drawing from three to four feet is uninterrupted, and it is only for about two months in the summer that three feet cannot be obtained as far as Peru, above which no examination was made; the resolution of Congress fixing the termination of the canal as the highest point to which the survey should extend. For the last three years, the water has not been as low as this, but has admitted the passage of boats drawing from two and a half to three feet, without interruption.

The obstructions consist entirely of bars, formed for the most part by the deposite of sand and alluvial matter brought down by the tributary streams, and in some cases by the widening of the bed of the river itself. Their position is in almost all cases oblique to the axis of the streams, though sometimes running for miles parallel with it, having deep water on each side of the spit, which is frequently only a few yards in width. A remarkable uniformity prevails in the shape and position of these bars relative to the banks, indicating a similar uniformity in the laws by which they were formed; so that a description of one of them is sufficient to give a clear idea of the nature of all. When the water is low, the greater portion of these bars are exposed, and at a medium stage, the vast quantity of aquatic weeds with which the bottom of the river is covered, points out their position with unerring exactitude. In some cases the bottom is irregular, consisting of sand reefs, as they are termed by the pilots, which have no well defined form, but consist of lumps, or small isolated elevations, not connected in a regular chain, having deep water between and around them, and rendering the navigation in their vicinity somewhat intricate.

The form and position of these bars, although composed of materials so easily operated upon by a current, remain from year to year without perceptible alteration, unless it should happen that the river breaks up suddenly in the spring; in which case the ice, instead of gradually dissolving, is carried down in masses by the current, and by its mechanical action upon the bottom, some change is occasioned in the channel. This, I was informed, is not, however, ordinarily the case, and a most remarkable uniformity in the form and position of the bars, the depth of water on them, and the direction of the channel, from year to year, is the consequence.

A few logs and snags are here and there to be found; but the obstruction from this cause is much less than I have ever witnessed in other fresh water streams. No danger is apprehended from them, as for reasons above stated, they retain their positions from year to year, and being few in number, and their localities perfectly well known, they are easily avoided.

As was heretofore remarked, no hesitation is felt in recommending the mode that should be adopted for the improvement of the navigation of this stream. The only doubt is, as to the extent to which it should be carried. When compared with other streams in the west, the Illinois, even in its present unimproved state, is superior to most of them in the depth of its waters. The improvement of the Tennessee contemplates at the utmost the attainment of a depth of only twenty-four inches; and that of the Ohio, between Pittsburgh and Wheeling, a depth of thirty inches; whilst the Illinois in its natural state, has at no time (with the exception of two or three bars) a less depth than two feet, and that only in extremely dry seasons, and for a short period in midsummer. For the last three years its navigation by steamboats of from one hundred to one hundred and fifty tons, has not been suspended for a single day, except in winter by the ice, whilst scarce a season passes when the Ohio, even as far down as Cincinnati, is not for a longer or shorter period too low for navigation, even by boats of the smallest class. The only question then was, to what extent is the improvement of the Illinois necessary? This would in some degree influence the mode of improvement to be adopted.

But two methods present themselves which are at all applicable to the present or probable state of the trade, or to the regimen of the river itself. These are, the construction of wing dams, so as to direct and concentrate the force of the current upon the bar to be removed; and the excavation of channels through the several obstructions of a depth sufficient to furnish at the lowest stage, three feet water over them, which is the greatest depth contemplated.

To the first of these plans, there are several strong objections.

1. The current of the river is so sluggish, that it is believed a velocity could not even by this means be given to it, sufficient to remove the bars entirely, and even if the plan were successful, its effects would only be temporary; for the matter removed, as soon as it reached a portion of the river where there was little or no current, would again be precipitated, and form lower down another obstruction equally detrimental with the first, unless indeed a succession of works of the kind should be erected, so as to remove the deposite entirely from the river, the expense of which alone, were it certain to be successful, would far exceed the cost of the construction of an independent canal.

2. The elevation of the banks above the surface of the water is so small, that the erection of such works at each bar, by obstructing the free passage of the water, would cause the inundation of the adjacent flats to be more frequent; and, for the same reason, the overflowing water would be deeper, and remain much longer, stagnating in the low grounds and extensive lagoons, in which the bottoms abound, and thus proving a serious injury to the health of the surrounding region of country.

3. No stone was observed upon the whole length of the stream, except near the mouth, where a high rocky ridge separates its valley from that of the Mississippi The total absence of this indispensable material would, of itself, constitute a serious objection to the adoption of this plan. The whole of it would have to be transported in boats to the several points from

a great distance; and the vast expenditure that would be required for this item alone, would not be justified by any advantage to be expected from the improvement. Many of these dams would require to be from one-half to three-fourths of a mile in length, and any plan involving so heavy an expense, and which, after all, would only partially remedy the evil, and that for a few years only, leaving the navigation as bad, if not worse, than it was before, cannot but be very objectionable.

These remarks apply with peculiar force to that part of the river embraced between Beardstown and its junction with the Mississippi. The high water from the latter, not unfrequently backs up as high as that town, and causes the current, especially near the mouth, to flow up the stream. This portion of the river, as might be expected, is now more full of bars than any other; and the inevitable consequence of the adoption of the plan under consideration would be, that the deposite brought down by the increased velocity of the stream, meeting either a counter-current, or one deadened and rendered sluggish, from the back water of the Mississippi, would soon be precipitated, and, by its accumulation, form a more serious obstacle to the navigation than at present exists; and that by the very means taken to remove them.

It is by no means intended, in what has here been said, to reflect, in the least, upon the adoption of this mode of improvement upon other streams, where it may be highly proper and beneficial; but simply to state the reasons which are, in my opinion, conclusive against its employment in the present case.

The only plan, which is at all likely to prove of any advantage, is the second one proposed, viz: To excavate channels through the bars, and that only to a limited extent. This mode is believed to be peculiarly adapted to this river, as the deposites form very slowly, in consequence of the quantity of alluvial matter brought down by the current being unusually small. It is not pretended that the channels thus formed would remain permanent ever afterward; nor is the adoption of the measure recommended on this ground. Such would not be the case. The same causes which originally combined to form the obstructions will continue to operate; and the filling up of the excavated channels, in the course of time, will be the necessary consequence. But no doubt is entertained that, as in this case the operation of these causes is unusually slow, a considerable period would be necessary to produce the result.

The plan recommended, is to purchase a dredging machine, to be constantly employed during the summer months, first in excavating channels through the bars, and afterward in keeping open the passages thus formed. It is believed that a depth of three feet would amply accommodate any probable amount of transportation upon the river; and from the fact that two feet water is already found, (save on one or two bars,) an excavation of one foot in depth, and, in many cases, of six inches only, would effect this object. A dredging machine, calculated to work in such a small depth of water, could with ease open a channel through all the bars in the course of one working season.

The only objection to this plan, (certainly the most economical,) is the danger that, by cutting through the bars, the river above would be more rapidly drained, and by thus lowering the surface of the water, other bars higher up would be exposed, which now lie too deep to form any obstruction. This might form a serious obstruction; and, in order to obviate it as far as possible, it is recommended that the worst bars only (to be hereafter mentioned in detail) be removed first, and that the channel excavated should not exceed thirty yards in width. The effect of the excavation upon the river above should be carefully observed, and if found to prove injurious, the width of the channel should be further contracted, so as to allow the passage of a single boat only at a time. When it is considered, that the greatest depth to be excavated will not exceed one foot, and that, in many cases, six inches only will be necessary; that the fall of the stream is very small, and the current in consequence very sluggish; and that it is constantly receiving supplies of water from numerous and large tributaries, it is believed much danger from this cause need not be apprehended.

It has been suggested that a system of lock and dam navigation would be the best mode of improvement for this river. I consider such a scheme would be not only impracticable, within any reasonable expense, but that it would prove ruinous to the navigation of the stream.

The bed of the river consisting, as it does, of sand and alluvial matter, does not afford sufficient foundation to give the necessary solidity to the works which would be required. Materials for their construction would have to be transported from a great distance. It would, therefore, be very expensive. The advantage to be gained would not be commensurate to such expense, since a constant navigation of two feet is now open. The annual expense of keeping the works in repair, the employment of lock tenders, &c. would also be very considerable. It would be of use only for a limited period of the year, and some years not at all. During the whole of the residue of the year, the dams would prove a more serious impediment to the trade than the obstructions they were intended to remove. And lastly, they would occasion the constant inundation of the bottoms for many miles on each side of the river, and would spread pestilence and death amongst the population of its valley.

I will now proceed to an enumeration of the different obstructions, their localities, with the estimated quantity of earth to be removed from each, and submit an estimate of the expense of improving the navigation upon the plan above recommended.

After entering the river, the water is good as far as Macoupin creek, about twenty-three miles from the mouth, when commence what are termed the French bars.

The channel crosses over to the eastern shore above the head of the island above Macoupin creek, and then recrosses to the island. Upon the upper bar, two feet is found generally, although the water has been as low as eighteen inches. Upon the lower, two and a-half feet can be obtained. Through the lower a cut of two hundred yards, and through the upper a cut of three hundred yards, will be required. The depth is constantly varying, being dependant upon the height of the Mississippi. The bottom consists of sand and soft mud, and is easy of excavation. The number of cubic yards to be removed amounts to six thousand five hundred, which should be deposited between Macoupin island and the western shore.

From the French bars the water continues good for fourteen miles, to the mouth of Apple creek. The river is shoal in places, but no serious obstacle is met with.

APPLE CREEK BARS.

Two bars occur at this point. The first makes out from the east shore immediately above the mouth of the creek; the other extends diagonally across and down the river from the eastern to the western shore above it. They are both short, although the upper bar is one of the shoalest in the river. To give three feet in the lowest stage, the first will require a cut of one foot for fifty yards, and the second a cut of twenty-two inches for sixty yards =1,600 cubic yards.

After crossing the two bars above Apple creek, the river continues shoal for about four miles, and may require some little excavation. The obstructions consist of lumps and "sand reefs," having no regular formation, but rendering the channel crooked and uncertain. No regular bar occurs, however, until reaching the

OTWELL BAR.

This obstruction is formed by a bar crossing the river diagonally from the east to the western shore. It is one of the shoalest bars in the river, having but 18 inches water upon it in very dry seasons. The bottom consists of blue mud and sand in which a pole may be sunk thirty feet. It will require an excavation of 18 inches for 150 yards =2,250 cubic yards.

The next obstruction occurs at the

GRAND PASS BARS,

Four miles above Otwell bar, and six miles below Bridgeport. These consist of two bars, distinguished by the name of Grand Pass, and Stewart's bar. They, by a deposite extending from the foot of two small islands, cross the river obliquely to the western bank, and, forming a curve, return to the eastern shore. The lower, or Stewart's bar, will require a cut of one foot for sixty yards. The Grand Pass bar will require a cut of one foot for two hundred yards =2,600 cubic yards.

BRIDGEPORT BARS.

Just below Bridgewater the channel passes between Garrison's island and the west shore, crosses from the head of the island to the east shore, and immediately below the town, re-crosses to the west bank. In the island chute, a cut of six inches for one hundred yards will be necessary, and above the head of the island a cut of one foot for one hundred yards =2,125 cubic yards.

LITTLE BLUE RIVER BAR.

This bar lies opposite the mouth of Little Blue river, two miles below Augusta. It will require a cut of six inches for four hundred yards =2,000 cubic yards.

BEVINGTON BAR.

One mile above Augusta, the channel crosses abruptly from the east to the western shore. A cut of six inches for one hundred yards will be nenessary =500 cubic yards.

BIG BLUE RIVER BAR.

This bar lies opposite the mouth of Blue river, and will require a cut of six inches for eighty yards =400 cubic yards.

MAUVISTERRE BARS.

A spit commences about one and a half mile below Naples, and extends three miles down the river. The channel crosses this shoal four times; once opposite Naples from the west to the east, it then re-crosses to the west shore above Mauvisterre creek, again crosses to the east shore opposite the mouth of the creek, and continues down that shore for two miles, where it re-crosses to the west shore. At each crossing some improvement will be necessary. Near Naples a cut of six inches for eighty yards; above Mauvisterre creek, a cut of one foot for eighty yards; opposite the mouth of the creek, a cut of one foot for one hundred yards; and two miles below, a cut of six inches for one hundred and seventy yards, will be required =3,050 cubic yards.

From Naples the navigation is good, for twenty-five miles, until arriving at the

BEARDSTOWN BAR.

This bar, which lies about two miles below Beardstown, is the worst bar on the river. A deposite has been made by the river commencing at the foot of a large island and extending rather more than half a mile obliquely down the stream, where it joins the western shore. The channel is close under the western bank, where it crosses the bar. The water, I was informed, has been as low as fifteen inches on this bar, but for the last three years it has never afforded less than eighteen or twenty. The water on each side of the bar and close up to it is deep. Its length does not exceed fifty yards, and its composition is sand. The quantity of earth to be removed amounts to one thousand cubic yards.

Between Beardstown and Peoria, the navigation is very little obstructed. A bar at the mouth of Sugar creek, one in the eastern chute of Grand island, a middle bar above Grand island, one off the mouth of Copperas creek, and one below Kickapoo creek, are the principal. Upon all of them a depth of two feet, and upon some two and a half feet, is to be found. The estimated quantity of earth to be removed, amounts to seven thousand cubic yards.

Above Peoria the navigation continues good until within two miles of Henry. A shoal occurs at the head of two islands, called the Two Brothers, upon which two and a half feet is to be obtained, requiring a cut of six inches for one hundred yards =500 cubic yards.

At Henry a gravel bar is formed by the junction of Sand creek with the river; cut one foot for fifty yards =500 cubic yards.

At the foot of "The two Sisters" five miles below Hennepin, the channel crosses from the west shore to the foot of the lower island and passes up between them. There is plenty of water except for one hundred yards across the shoal below the island, upon which a depth of two feet only can be obtained. To open the communication a cut of one foot for that distance will be necessary =1,000 cubic yards.

A shoal is found at the head of the island immediately above Hennepin, which will require the removal of two thousand cubic yards.

The next bar occurs at the mouth of Bureau creek, two miles above Hennepin. Cut, one foot for one hundred yards =1,000 cubic yards.

A middle bar occurs opposite the head of the first prairie, below Negro creek. Cut, one foot for two hundred yards =2,000 cubic yards.

A gravel bar is forming opposite the mouth of Negro creek, but there is sufficient water between it and the eastern shore.

The last obstruction occurs at the Spring creek bar, four miles below Peru. A cut of one foot for two hundred and fifty yards will be necessary =2,500 cubic yards. From this point to Peru the water is very deep.

The following estimate will show the cost of a dredging machine of six horse power, capable of raising twenty-five cubic yards of earth in an hour, with scows, &c. complete; and which, as was before observed, it is proposed to keep constantly employed upon the river, together with the annual cost of working the same, upon the supposition that the state of the water will allow its use from the 1st of May to the 1st of November.

Cost of dredging machine and engine complete	$7,500 00
Two receiving scows	1,000 00
Purchase of 250 cords of wood for engine for the season of 157 working days, at $2 50	625 00
Pay of superintendent, one year, at $100 per month	1,200 00
Pay of steam engineer, one year, at $75 per month	900 00
Two deck hands, six months, at $20 per month each	240 00
Three hands to manage the scows 6 months, at $20	360 00
Subsistence of seven men 6 months, at $10 each	420 00
Repairs of engine, contingencies, &c., say	500 00
	$12,745 00

Deducting the cost of the dredging machine, scows, &c., the annual cost will amount to $4,245 00.

The State of Illinois at its last session appropriated the sum of $100,000 for the improvement of this river; of this sum $8,500 will be required for the purchase of the necessary machinery. The interest on the balance amounts, at 6 per cent., to $5,490 00, will exceed the annual estimated expense $1,145 00.

The total number of yards of earth to be excavated, amounts to something less than 40,000, which under favorable circumstances can be done in the course of one working season. What portion of the year it will be necessary to keep the dredging machine employed afterward, must depend upon the rapidity with which the excavated channels fill up, and can only be determined by actual observation.

KASKASKIA RIVER.

After completing the survey of the Illinois, the party proceeded to Vandalia, and prosecuted the examination of the Kaskaskia to its mouth.

This stream rises in the eastern part of the State, and pursuing a southwesterly course, discharges its waters into the Mississippi, about eighty miles below St. Louis. That portion of it below Vandalia, occupies a broad extent of bottom land, generally several miles in width, which in times of freshets it overflows from bluff to bluff, to the depth of eight or ten feet, and is then a mighty river. The bottom lands are consequently uninhabitable, and are covered with a dense growth of heavy timber. They are alluvial and very rich. Limestone and coal occur at several points on the river.

During the summer months, the water falls very low, scarcely covering its bed more than a few inches in depth, at which time it is impassable by the smallest canoe. Its course is extremely serpentine, winding from side to side of its broad valley with short and sudden bends. The distance from Vandalia to the mouth of the river by land, is ninety-five miles, whilst by water it is about three hundred and twenty.

The obstructions to its navigation in high water, consist principally of snags, overhanging timber, and sharp sudden bends, in the course of the stream itself, and in the summer from an insufficient supply of water. There is descent in the bed of the river, causing a rapid impetuous flood when the stream is over its banks, but which, in consequence of the sinuosities of its course, is very much reduced in velocity in the dry season, when the water is confined within its natural limits.

An examination of this stream was made in the year 1830, by direction of the State of Illinois, and some timber and snags removed; the opinion was then expressed that a slack water navigation could be obtained as high as Vandalia, at a very moderate expense. After a careful and minute examination of the bed of the stream, I am obliged to differ from this opinion. It is believed that the cost of such navigation, imperfect as it is, would in this instance very far exceed any beneficial effects which might be expected to be realized from it.

It will be conceded, in order to justify the construction of a series of locks and dams, sufficient to afford a constant navigation for three hundred miles, the facilities afforded by this plan of improvement should be greater, and the cost of transportation cheaper, than by any other mode; that such an improvement be demanded by the necessities of the country; and that the successful operation of this mode of improving the navigation of rivers, should at least, in some degree, have become established by experience and precedent. In neither of these respects is it conceived, that the adoption of this plan would be justifiable in this instance.

To afford the necessary facilities in cheapness and quickness of intercourse, the use of steamboats would be indispensable; for a single glance at the map will at once satisfy the mind that no transportation carried on by keel boats on the Kaskaskia, could for one moment compete with that now carried on by the more rapid route of the Mississippi.

Take a merchant at Vandalia or Carlyle, for instance. He purchases his goods, say, at New York, Philadelphia, or Baltimore. They arrive by the various routes over the mountains at Pittsburgh, or Wheeling, where they are shipped for St. Louis. From St. Louis they are transported a distance of about eighty miles in wagons, to the point of their destination. Now can it be for a moment supposed that these goods would be discharged at the mouth of the Kaskaskia, and shipped on board of a keel boat, which would have to be pushed three hundred miles up stream by human labor, when by continuing their voyage for but eighty miles farther (to St. Louis) in the boat in which they were originally shipped, they might be enabled to reach their destination in four or five days? The cost of freight between Pittsburgh and St. Louis, or Pittsburgh and the mouth of the Kaskaskia, would be very trifling, and the cost of transportation from St. Louis to Vandalia does not exceed twenty-five or thirty cents per hundred, or $6 per ton.

But supposing them to be discharged at Chester, a keel-boat of fifteen tons burden loaded, would require at least five men for its management, and they would make their way up the stream at an average of about fifteen miles a day, thus occupying twenty-one days in the voyage from the mouth to Vandalia. I will suppose the cost of the wages and subsistence of five men to amount to $1 25 per day each, and will throw out of view the interest on the cost, and the wear and tear of the boat. The cost then of transporting fifteen tons from the mouth of the Kaskaskia to Vandalia, independent of the tolls chargeable for passing the locks, will amount to $105 00 or $7 00 per ton, while by the Mississippi route, the cost will be but $6 00, and this at a loss in the former case of sixteen days in the arrival of the goods. This is the most favorable view of the case; for in times of freshets the progress of boats would be very much impeded, if not entirely arrested, by the depth and velocity of the current.

The use of steamboats then would be indispensable. To this a very material obstruction presents itself in the sharp and sudden bends of the river, very many of which are too abrupt to allow a boat of more than one hundred feet in length to follow them. Boats of a small class and calculated expressly for the navigation of this stream would have to be constructed.

The principal objection, however, to the plan under consideration is, that the river in the dry seasons does not afford sufficient water to supply the necessary lockage. At Vandalia it did not yield more than ten cubic feet per second, being insufficient to supply the lockage and evaporation for a canal of ordinary size, for more than seven and a half miles. This would occasion interruption in the regular transportation of goods. Again, the inundation of the bottoms is now from eight to ten feet in times of freshets. The depth of water would be increased by the dams, and the periodical submerging of the locks themselves would be the consequence. They would thereby become filled with mud, and the cost of keeping them clear would be by no means inconsiderable.

Above Carlyle especially, I deem the permanence of any dams that could be constructed across the river extremely problematical. The nature of the soil is such that the water would soon force its way around the roots of the dams, carrying away with it the earth that opposed its progress. For these reasons I deem the adoption of a system of lock and dam navigation upon this stream to be highly inexpedient, if not impracticable.

The necessities of the country do not demand an improvement so expensive. I do not mean by this to say that the free and uninterrupted navigation of a river like the Kaskaskia would not be very desirable, and is not needed by the country through which it flows; but I mean to say that the navigation of this stream during the whole year is not so indispensable as to warrant the expenditure of so large a sum of money as must necessarily be incurred to effect it; and that a safe and cheap outlet for the comparatively bulky products of agricultural labor would be sufficient for the necessities of the country, especially as the returns for these products, coming in the form of goods and merchandise, can be introduced in various other modes than by the river.

At the session of the Legislature of Illinois, in 1836 and 1837, and subsequently on the 12th of January, 1838, appropriations were made for the construction of a railroad from the junction of the Mississippi and Ohio rivers to the termination of the Illinois and Michigan canal, and thence to Galena, which is to pass through Vandalia; also from Alton on the Mississippi to Mount Carmel on the Wabash, which will cross the Kaskaskia at Carlyle; also of one from Shawneetown on the Ohio, to Alton on the Mississippi, which will cross the Kaskaskia in the vicinity of Covington. Provision is also made for the connexion by railroad with the one first named, of the towns of Pekin, Peoria, and Meredosia, lying on the Illinois river.

By all these routes goods from a distance will be introduced into the country in preference to that by the Kaskaskia, because of their superior cheapness, certainty, and quickness of transportation. Especially will those that descend the Ohio stop at Shawneetown; those that come by the Erie and Wabash canal at Mount Carmel; those from the upper Mississippi at Galena or Alton; those from the east via the Illinois and Michigan canal at Peru, Pekin, Peoria, Meredosia, or Alton; from all which points they can be conveyed by railroad into the very heart of the State, and at least three of the principal towns in the valley of the Kaskaskia.

It may here, perhaps, be objected that the opinions above expressed do not properly come within the province of an engineer, whose duty, it may be said, is simply to determine upon the practicability and cost of any projected improvement. Had the resolution of Congress transmitted to me by the department, for my government, prescribed any particular mode of improving this stream, it would doubtless have been without the range of my duties to enter into a discussion of its necessity or propriety; but as this was left entirely to my own judgment, I deem it not improper to present, thus briefly, the reasons by which I have been governed in recommending that mode of improvement which I believe to be best adapted to the nature of the stream, and which I believe the exigencies of the country demand.

I am not aware of a single instance, either in this country or in Europe, in which the plan of improving rivers by locks and dams, to any extent, can be said to have completely succeeded; but where they have been resorted to in the first instance, they have gradually given place to independent canals, or to the more rapid and certain intercourse by railroads. Of this, the communication between Liverpool and Manchester is a remarkable instance, in which the improvement of the Mersey, and the Duke of Bridgewater's canal, have been almost, if not entirely, superseded by the railway at present in operation between those cities.

I believe, then, that a safe and certain *outlet* for the produce of the country is all that can be reasonably expected from this stream. If in times of high water, which occur in the winter or early in the spring, a safe navigation can be afforded to flat boats and rafts of timber descending the river, much will be gained. This can be done at a cost comparatively small. At present, the principal obstructions consist of rafts of timber, snags, logs, and trees, in the bed of the river. From the extreme crookedness of the stream, and the sandy, alluvial nature of the soil through which it flows, the water is continually washing away the banks and undermining the timber which falls directly across the stream, and in most cases the top of the tree becomes firmly imbedded in the opposite bank, where it remains, anchored at both ends, until it decays, or is broken by the weight and force of other floating timber brought down by the freshets. In other cases, it causes the lodgment of such descending timber, which, becoming fastened in the bottom or sunk by the accumulated weight from above, forms what is termed a raft or drift. Many such have been formed, and in many instances have forced the river to excavate for itself a new channel around the drift, and in some cases across large bends; some of these channels, or "cut-offs," are several miles in length. In order to render the navigation safe, these snags, trees, and drifts must be removed: but if we stop here, the next freshet will leave the river in nearly as bad a condition as before. The *cause* must be removed; that is, the timber on the banks must be cut off. In the improvement made below Carlyle by order of the Legislature of Illinois, the *overhanging timber only* was cut off, and the consequence is, that, although some difference is visible between that part of the river and such portions as have not been touched, yet the river is very full of snags and logs, which have fallen in from the banks, or, coming from above, have lodged, since that improvement was made. Now, in order to prevent such a result in future, it is proposed to cut off the timber, for a width of at least fifty feet, from each bank of the river along its whole course, in addition to the removal of the obstructions found in the bed of the stream itself. Not only should the logs be cut out, but the roots of such trees as have fallen into the stream, and which will probably never float away, should either be blasted or removed to such a distance as will prevent the danger of their being washed into the stream again. By these means, a more free and uninterrupted passage will be afforded to the immense floods of water and masses of drift wood which come down with every freshet; the depth to which the bottoms will consequently be lessened, and thus much valuable land reclaimed, and the time during which it will remain flooded will also be lessened. In some cases, it may be proper to cut off the timber across a point, and leave the water, in times of freshets, to excavate a passage for itself. This, I am informed, has been done more than once, and with complete success. This fact will show, very forcibly, of what light material the soil of the Kaskaskia bottoms is formed, and what prospect of permanence a system of lock and dam navigation would present without frequent and expensive repairs.

It is believed that the above project embraces all that can be done, at a moderate expense, to afford to the valley of the Kaskaskia an avenue to market. Should a constant, uninterrupted communication with the Mississippi be desired, I have no hesitation in stating that, in my opinion, an independent canal will be more economical in the end, and is, indeed, the only expedient which can be expected to attain the end in view.

As to the practicability of such a work, no opinion is expressed, as no examination was made upon which it could be based.

The estimated expense of the improvement recommended is as follows:

Clearing the river of drift logs and snags, 320 miles, at $100 per mile - - - - - - -	$32,000 00
Cutting off timber for 50 feet on each side of the river, 12.1 acres per mile, for 320 miles, at $10 per acre -	38,720 00
	$70,720 00

I was aided in the prosecution of these examinations by Messrs. M. H. Stansbury and George Smith, who were assigned to me by the department for that purpose.

I have the honor to be,
Sir, very respectfully,
Your very obedient servant,
HOWARD STANSBURY,
U. S. Ass't Civil Engineer.

Lieut. Col. John J. Abert,
Topographical Engineer, U. S. Army.

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